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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,045	11/19/2003	Ronald Scott Bunker	124698-1	3484

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER

NGUYEN, NINH H

ART UNIT PAPER NUMBER

3745

DATE MAILED: 05/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary**Application No.**

10/720,045

Applicant(s)

BUNKER ET AL.

Examiner

Ninh H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-22, 25-27, 29 and 36-40 is/are rejected.
- 7) ☒ Claim(s) 10, 23, 24, 28 and 30-35 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/19/03, 02/28/05</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claims 3 and 23 are objected to because of the following informalities:

Claim 3 should be dependent on claim 2 since the limitation of intersection points is recited in claim 2 not claim 1. Note that claim 3 is assumed to be dependent on claim 2 in this Office Action.

Similarly, claim 23 should be dependent on claim 22 instead of claim 19 since the limitation of “a cooling hole” is recited in claim 22. Note that claim 23 is assumed to be dependent on claim 22 in this Office Action.

Appropriate correction is required.

Double Patenting

2. Claims 1-5, 11, 15, 16, and 22 directed to the same invention as that of claims 1-5, 16, 6, 7, and 17, respectively of commonly assigned Application No. 10/881,506. The issue of priority under 35 U.S.C. 102(g) and possibly 35 U.S.C. 102(f) of this single invention must be resolved.

Since the U.S. Patent and Trademark Office normally will not institute an interference between applications or a patent and an application of common ownership (see MPEP Chapter 2300), the assignee is required to state which entity is the prior inventor of the conflicting subject matter. A terminal disclaimer has no effect in this situation since the basis for refusing more than one patent is priority of invention under 35 U.S.C. 102(f) or (g) and not an extension of monopoly.

Failure to comply with this requirement will result in a holding of abandonment of this application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-7, 11-14, and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (6,331,098) in view of Bunker et al. (6,644,921).

Lee discloses a component (Fig. 4-6) comprising at least one wall 14 having an inner portion and an outer portion; a plurality of pins 58 extending between the inner and outer portions of the wall, wherein the pins define a mesh cooling arrangement comprising a plurality of flow channels (Fig. 5);

wherein the first and second sets of flow channels intersect one another at a plurality of intersection points to form said mesh cooling arrangement (Fig. 5);

However, Lee does not disclose a plurality of dimples located in at least one of the inner and outer portions of the wall; and wherein at least one of said dimples is positioned at a respective one of the intersection points; wherein at least one of said dimples is positioned between a respective pair of said pins; wherein a majority of said dimples are positioned between respective pairs of said pins as claimed.

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Bunker teaches a turbine airfoil 200 (Figs. 4-7, 11, 12) comprising a plurality of cooling passages 202, each passage having an interior surface comprising a plurality of dimples 206 arranged in an array pattern to enhance heat transfer from the airfoil surfaces without pressure loss due to friction (col. 2, lines 58-61).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to make the turbine blade of Lee with the surfaces of the flow channels comprising a plurality of dimples arranged in an array pattern for the purpose of enhancing heat transfer from the airfoil surfaces without pressure loss due to friction as taught by Bunker. Since the dimples are to be formed on the flow channels surfaces in an array pattern, there will be dimples located in the intersection points.

Regarding claim 11, the modified turbine blade of Lee in view of Bunker will have a dimple surface diameter of 0.07 inches and a depth of 0.03 inches using the cooling passage diameter of 0.0-8 inches (Bunker col. 3, lines 4-9, 23-30, and 43-46).

Regarding claim 14, the modified turbine blade of Lee in view of Bunker can have shapes that are non-hemispherical (Bunker col.3, lines 62-65).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to make the modified turbine blade of Lee with the dimples having cone shape as an expedience in forming the dimples.

5. Claims 25-27, 29, and 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Bunker et al. as applied to claims 1-24 above and in further view of Lee (6,331,098).

Lee (5,690,472) in view of Bunker discloses all the limitations except a plurality of turbulators disposed on at least one of the inner and outer portions of the wall as claimed.

Lee (6,331,098) teaches a turbine blade comprising a plurality of internal cooling channels wherein each channel having a plurality of turbulator traversing the coolant flow, and forming an angle with the coolant flow to enhance cooling of the blade (col. 2, lines 13-29).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to make the modified turbine blade of Lee with a plurality of turbulators on at least one of the portions of the wall associated with the cooling channels for the purpose of enhancing cooling of the turbine blade as taught by Lee ('098).

6. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Bunker et al. as applied to claims 1 and 7 above and in further view of Bunker et al. (6,234,755).

Lee in view of Bunker ('921) discloses all the limitations except at least one thermal barrier coating on the outer portion of the wall as claimed.

Bunker ('755) discloses a turbine blade comprising side walls 26 and 28 and a thermal barrier coating is formed on the side walls to protect the side walls from damage in high-temperature environment (col. 1, lines 7-10).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made, to make the modified turbine blade of Lee with a thermal barrier coating on the outer portion of the wall to protect the wall from damage in high-temperature environment as taught by Bunker ('755).

Allowable Subject Matter

7. Claims 10, 23, 24, 28, and 30-35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior Art

The prior art made of record but not relied upon is considered pertinent to applicant's disclosure and consists of 2 patents.

Hasz et al. (6,589,600) and Bowling (3,616,125) are cited to show heat transferring components having dimples and turbulators, respectively.

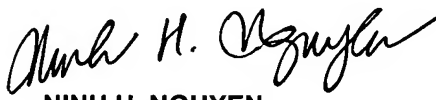
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Ninh Nguyen whose telephone number is (571) 272-4823. The examiner can be normally reached on Monday-Friday from 7:30 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached at (571) 272-4820. The fax number for this group is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, please go to <http://pair-direct.uspto.gov> or contact the Electronic Business center (EBC) at 866-217-9197 (toll-free).


NINH H. NGUYEN
PRIMARY EXAMINER

Nhn
May 2, 2006